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ABSTRACT

This report describes the sequence of activities that took place as the Examination Division of the New Jersey Department of Civil Service introduced a word processing system for a test item bank and for production of camera-ready test copy. The equipment selection, installation and orientation procedures are discussed. Keyboard and CRT terminals, printers, a hard disk memory system and auxiliary equipment for component use were purchased. Concurrently, seven examination sections updated the classification system of the "Item File Catalog" for item input and for coding item types other than single multiple-choice items, including essay, oral, performance and item sets. On a monthly schedule, each examination section submitted 150 items which were coded and stored. Sets of items making complete tests can be corrected and printed. By June 1981, the system was found to be functioning satisfactorily. Discussions and examples are included of item classification and coding, item bank procedures, projections of future equipment placement and operation, and compatibility problems and solutions. Among the item categories are English, Arts, Physics, Law, Psychology and 56 other occupational areas. (CM)

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WORD PROCESSING FOR ITEM BANKING AND TEST PRODUCTION

Final Report for IPA Grant 80-NJ-01
June 30, 1982

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ABSTRACT

The report describes the sequence of activities that took place as the Examination Division of the New Jersey Department of Civil Service introduced a word processing system for item banking and test production. Discussion and examples are included of item classification and coding, procedures developed, projections into the future, and problems and solutions.

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One product of IPA Grant 78-NJ-12 was a report and proposal entitled, Automation of the Examination Division Test Item File and Test Production Procedures. That report led to a proposal submitted to the Office of Personnel Management for an IPA Grant (80-NJ-01) to fund the "Automation of the item file in the Examination Division of the New Jersey Department of Civil Service." A grant was awarded in the amount of $65,000 for the period December 1, 1979 to November 30, 1980. The completion date was subsequently extended to December 31, 1981, and then to June 30, 1982.

The report of Grant 78-NJ-12, referred to above, had concluded that word processor technology was the most appropriate approach to satisfy the Division's requirements for item banking. Many functions included in most item banking plans were already automated in the New Jersey Civil Service system. These included candidate registration, test scoring, test and item analysis, score reporting, and production of lists of eligibles. The only functions that remained to be automated were test item storage and retrieval, and production of camera-ready test copy.

The project staff studied the literature on word processing, and discussed the feasibility of using the equipment offered by various manufacturers. Over several months, representatives of seven vendors were seen. A committee was established, consisting of the Division Director, the Assistant Director for Test Development, the Supervisor of the Research and Special Programs Unit, a representative of the Department of Civil Service Data Processing Unit, an Examination Section Supervisor, and the Item Bank Coordinator.

The committee's task was to select the word processing system best qualified to perform the item banking functions required by the Examination Division. Four companies demonstrated their equipment -- AM-Jacquard, CPT, Lanier, and Wang. Committee members independently rated the capability of each vendor's system to perform specified item banking operations. The committee members unanimously ranked the CPT system as the most capable.

The set of equipment for initial purchase, and for which grant funding was sought, included:

2-consoles with keyboard, cathode ray tube, and dual 8" disk drives (model 8000),

1-45 to 55 word per minute, letter quality printer (Rotary V),

1-300 line per minute high speed printer (GE Terminet 5100),

1-50 million character hard disk memory system (WordPak II), and associated auxiliary equipment

The "auxiliary equipment" referred to several times in this report includes the various items required to inter-connect the components or to make their use more effective. They include bi-level work station tables, sturdy enough to hold the 120-pound consoles; printer stands to accommodate continuous feed paper; multiplexers, to connect several consoles to one printer; static mats to protect consoles from build-up of static electricity, forms tractors to move continuous feed paper through a printer; and a multitude of other items.

A "Purchase and Expenditure Request" was initiated on May 23, 1980 for purchase of the system. The request was subject to delays in the Purchasing Division, Department of Treasury, because of the unusual use that was proposed for the system.

Extracrdinary justification was required. One example was the need to justify separately the purchase of a General Electric Terminet (300 line/minute) printer from CPT, rather than directly from GE. The reason, of course, was to get the compatible circuits and programs for the CPT console to drive the GE printer.

By August 18, 1980 there was enough assurance that a purchase order would be forthcoming for the Division Director to send a letter of intent to purchase to CPT. The Purchase Bureau issued the requisition on September 4, 1980. On December 29, 1980, CPT delivered two consoles and the letter quality printer. These units were not connected until mid-February, 1981 because of renovations being made to the building in which the Examination Division is located.

Three unit employees attended a two-and-a-half day training session at the CPT office in Philadelphia. During February, March, and April, CPT system specialists made many visits to assist in the development of procedures for console and printer operation for the unusal item banking applications.

The GE Terminet high-speed printer was delivered and installed in March, 1981.

Orientation and demonstration meetings were scheduled for all Test Development Personnel -- from Section Supervisors to Clerk-Typists.

Concurrent with the waiting for delivery and installation of system components, the seven Examination Sections began to update the classification system of the Item File Catalog. Procedures were developed for coding items and for assigning unique serial numbers.

Procedures were also developed for keeping track of items during the input operations and for coding item types other than single multiple-choice items (essay, oral, performance, item sets, etc.). Item coding protocols are shown in Appendix 1.

Some Examiners and Supervisors were hesitant to accept item banking. Some were reluctant to give up, or expose to other sections, their private item pools. Some felt threatened by the idea of a central agency holding all the Division's items. Those negative attitudes seem to have dissipated; the Item Bank is no longer seen as a threat. Responsibility for quality of camera-ready test copy remains in the Examination Sections.

The procedure for entering items into the Item Bank can be summarized as follows:

1. A monthly schedule is issued, calling for each Examination Section to submit 150 multiple-choice items, about every seven working days.

2. Item Bank operators key items onto screen and disks, along with code numbers and source, reference, or other information desired.

3. Sets of items are printed on the high-speed printer, are given a first reading for error detection, and are returned to the Section for further proofreading. Printouts are returned to the Item Bank for corrections to be made to the items on the disk, and another printout is made for the Section. This procedure continues until a letter-perfect printout is made.

4. Procedures were also developed for filing and for retrieving illustrations in items.

Copies of the various procedures are in Appendix 2.

With equipment, trained operators, and some procedures in place, the Item Bank began operations on April 13, 1981. By June 30, 1982, a total of 32,286 items had been put on disks in the item pool. This figure represents 43.0 percent of the estimated 75,000 items in the Division's files. Initially, only single multiple-choice items were accepted for processing.

More complex item types and item sets with written or graphic stimulus material were being submitted by some sections toward the end of 1981.

Test assembly from the Item Bank and production of camera-ready copy began without formal announcement or arrangement, as examiners realized that there were enough items on disks for a section of an examination to be produced. The Item Bank staff welcomed these requests, as they were a low pressure opportunity to develop efficient procedures for test production. By the end of December, 1981, several complete tests had been produced from the Item Bank.

Additional programs have been purchased to make the equipment more useful. The Sort program allows us to sort large numbers of items alphabetically. The procedure places identical items next to each other on a printout, allowing us to identify duplicate items. A Math program helps examiners calculate job analysis weighting factors.

The initial set of equipment represented only the beginning of a fully operational system. Its use confirmed the feasibility of using word processing technology for item banking. Delivery of the large scale memory unit was delayed for more than a year; but was finally installed in March, 1982. Until that time the system operated in a "floppy" disk mode, in which items were stored on some 250 separate 8-inch disks. To assemble a test, operators extracted the specified items from several disks to generate a single "working" disk. Examination Section typists manipulate working disks to produce camera-ready copy.

By June 1981, the system was functioning in such a satisfactory manner that state funds were allocated to purchase three additional CPT 8000 consoles and one Rotary V printer.

The plan for the complete item banking and test production system includes the placement of one console in each Examination Section, with two consoles sharing a Rotary V printer. The central Item Bank will have three consoles, the memory unit, the high-speed printer, and a rotary printer that will be shared with an Examination Section. The arrangement segregates the main item file and access to it, while reserving the activity and responsibility of preparing camera-ready test copy to the Sections. Chances of inadvertent damage to the item file in the memory bank is reduced by allowing only the Item Bank operators to have access to the memory unit.

In April and June 1982, more equipment was requested as funds became available. Included were two Rotary V printers, one 8100 console, and upgrading three 8000 consoles to the 8100 configuration. Upgrading the consoles doubles their internal memory (to 128K bytes) and improves their operating capabilities.

Delivery of these items will leave the system four consoles and one printer short of the optimum equipment plan. The final printer should be one that can produce both regular characters and Greek characters and mathematical symbols. Such a printer, that is also compatible with the equipment and programs we have, is not yet available. However, CPT expects to have a 400-character printer in mid-1983. Appendix 3 shows the optimum system and interim arrangements.

The most serious problem with the system is the limited compatibility of the Terminet 300 1pm printer with the rest of the equipment. CPT keeps promising a revised program. The issue is discussed in more detail in Appendix 4.

While feasibility of using word processors for item banking and test production has definitely been confirmed, much remains to be done. Item input will remain a major task for, at least, another 18 months. Output, in the form of camera-ready test copy will steadily increase in volume. Eventually the paper card files can be eliminated, and all test assembly and production can be accomplished by the Item Bank system.

The project may be seen as a model for item banking with word processors. It demonstrated effective operation in the multi-disk mode, as well as in the more sophisticated large scale memory mode. The experience suggests the feasibility of a minimum system, consisting of one word processing console and one printer.

APPENDIX I

ITEM CLASSIFICATION AND CODING

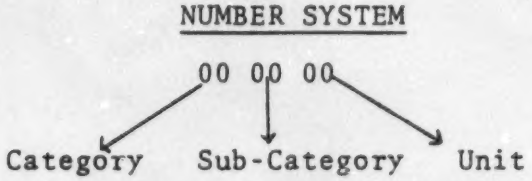
INTRODUCTION TO THE ITEM CLASSIFICATION AND CODING SYSTEM

Each item is coded with a 6 digit number:

1st two digits - Refer to the Subject Matter Category.

2nd two digits - Refer to the Sub-Category under the Subject Matter Category.

3rd two digits - Refer to the Unit under the Sub-Category.



Example:

45 00 00 - is the Category for TRADES

45 07 00 - is the Sub-Category for MASONRY and PLASTERING

45 07 01 - is the Unit for Masonry and Plastering TOOLS

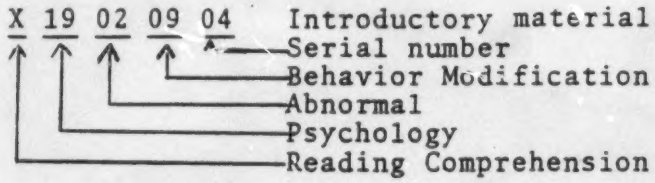
Items put into the Item Bank are assigned a three digit serial number which is added to the six digit subject area code. Individual multiple-choice items have the key letter added as the tenth character of the item code. The combination of six digit subject code plus three digit serial number gives each item a unique identifier, that will not be duplicated.

Item Bank Codes for Reading Comprehension and Other Sets of Items With Introductory or Stimulus Material

Item types that include a reading passage or other set of introductory material, followed by two or more multiple-choice items, will be coded with an initial letter that identifies the type of item-set. Codes are:

U other objective set
V situation - verbal
W situation - graphic or map
X reading comprehension
Y following directions
Z organization of material

For the code of the introductory material, the initial letter will be followed by the 6-digit subject matter classification, and a 2-digit serial number. For example: X19020904 means:



Items will be coded similarly: the initial letter to show type, the 6-digit subject classification, and 2-digit serial number. Items will have a tenth character, the key. Thus: X19020905B is the first item that goes with the passage X19020904. However, to firmly associate items with their passages, especially when additional items are written for passage already in the Item Bank, the identification line of the item will include the code of the passage it belongs to. These coding procedures allow any number of items to be related to a specific passage. They allow any number of those items, in any order desired, to be used with the passage on a test. The codes clearly indicate the type of item-set, which parts are the passage or stimulus material, and which parts are items.

Item Bank Codes for Test Booklet Directions

All text that may be reused in test booklets should be entered into the Item Bank so that it may be retreived without retyping. All elements in the Item Bank must have an identification code. Therefore, test directions and instructions must be coded prior to their entry into the Item Bank.

Directions that are suitable for use with items from more than one category will be coded:

B for a direction beginning a group of items, E for a direction ending a group of items, and a 3 digit serial number. For example, "B014" is a direction intended to precede a certain type of item; "E004" is a direction intended to follow a certain type of item.

If a direction is suitable for use only with items of a particular category, it may be coded with the category numbers between the initial letter and the serial number. Thus,

B190204002 is a beginning set of directions for a particular type of item about Abnormal Psychology - Mental Health (190204).

If a direction is to contain variable information, such as the number of items the direction pertains to, or the name of a reading passage, the variable information must be inserted during assembly of the test. The location of the variable information is shown in printouts as brackets, [ ].

Copies of the printout of the directions will be distributed to Examination Sections as soon as a substantial number are in the Item Bank, and before regular production of test copy begins.

Item Bank Codes for Non-Objective Test Material

Initial Code	Test/Item Type	Part
F	Oral	Problem Statement
G		Sample Answers
H	Essay	Problem Statement
J		Sample Answers
K	Completion	Problem Statement
L		Answer
P	Performance	Instructions for Examinee
Q		Instructions for Examiner
R		Score/Rating Sheet
S	Short Answer	Problem Statement
T		Answer

Non-objective test material will be coded for the Item Bank using the appropriate initial letter, shown above, followed by the six-digit subject matter category, and a three-digit serial number. All parts of a particular item will bear the same serial number. The Item Bank operators will supply the serial numbers.

Reference Information

The item code follows the item it identifies. The code is enclosed in brackets, which allows it to be included or deleted in printouts by use of a keyboard command. Any other information the item writer or originating section wants will be included in the bracketed area. These are the kinds of information some sections are putting into the reference area:

a. Identification of item author
b. Identification of reviewer
c. Identification of consultant
d. Dates of item origin and reviews
e. Source of item -- author, title, publisher, page
f. History of item use
g. Item Analysis Statistics
h. Section originating item

APPENDIX II

Item Bank Procedures

There were no precedents or models to follow in developing procedures for operations for item banking and test production. Formal procedures needed to be published in a form that demonstrated the Division management's support for the project. They were issued as a series of "Item Bank Procedures", signed by the Division Director, the Assistant Director for Test Development, and the Supervisor of Research and Special Programs. Before the end of 1981 the Item Bank concept was so much a part of the test development process that procedures could be implemented or changed by a memorandum from the Item Bank Coordinator to the seven Examination Section Supervisors.

The remainder of this Appendix consists of the text of the procedures and memoranda that define the way the Item Bank functions.

Introduction to the Item Bank System

This is the first of a series of procedures that will be issued as the automated Item Banking functions are developed in the Research and Special Programs Unit of the Examination Division.

Definition: The Item Bank is the system for entry, storage, retrieval, and production of camera-ready copy of tests from items stored in magnetic memory. These functions are done by the Word Processing equipment in the Item Room.

Objectives:

1. To enter, store, retrieve, and print all test items of all kinds used by this Division.
2. To provide review copies of items requested by examiners.
3. To provide camera-ready copy of selected items and directions, in sequence specified by examiners.
4. To provide physical security for the item collection.
5. To produce and update a duplicate copy of the item collection for secure storage at another location.
6. To develop appropriate procedures to implement these objectives, and to modify the procedures to reflect operational experience.

Procedure for Entering Items Into the Item Bank:

1. Item category responsibility: Primary responsibility for items in each category in the Item File Catalog has been established. The categories and responsible Examination Sections are listed in Appendix I.

2. Schedule: The Research and Special Programs Unit (RSP) will issue a schedule specifying the dates each Examination Section is to have a group of items ready for entry into the Item Bank. Sections will be scheduled in strict rotation. The frequency at which a Section will be scheduled to submit items will be a function of the number of operators available to the Item Bank.

3. Selection of Items for Bank: Section Supervisors will specify which items are to be put into the Item Bank each time his or her section is scheduled. The following priority has been established, and will be followed as closely as possible:

   a. Section files--all multiple choice items not also in the Item Room files.

   b. Directions will be entered at the same time items they pertain to are entered.

   c. Item Room files.

   d. Reading comprehension and other complex format items.

   e. Oral tests.

   f. Performance tests.

   g. All other tests not already entered.

4. Responsibility of Examination Section Supervisors: When scheduled to submit items for the Item Bank, the Examination Section Supervisor is responsible for having a batch of approximately 150 items, or the equivalent 30 pages of material, ready for an operator from RSP to pick up. Prior to pick up, such items must be:

a. Coded with the six digit code of the Item File Catalog. Item Bank personnel will add a three digit serial number that will make a nine digit code unique to each item.

b. Correct and error free. Clear hand-written changes are acceptable.

c. Keyed by indication of the correct answer. RSP Unit personnel will add the key of multiple choice items to the nine digit code, so that a list of the codes of the items on a test will automatically generate a test key.

d. Current and up-to-date.

e. Unique (i.e. not duplicates of item previously submitted for entry).

When a batch of items has been entered into the Item Bank, the set will be printed out. The printout and original material will be returned to the Examination Section Supervisor. He or she is responsible for checking the printout for technical accuracy, psychometric acceptability, and freedom from errors. If necessary, the printout, with correction clearly marked, will be returned to the Item Bank. The review and correction cycle will continue until all items are letter perfect. The Supervisor will return the last, completely correct, printout to the Item Bank, signed to indicate approval.

5. Sequence of Operations by RSP Unit to put items in the Item Bank:

a. Pick up a batch of items from the scheduled section.
b. Refer to log book to determine next serial number to use.
c. Record 3-digit number on first card.
d. Add key code as 10th character.
e. Repeat number assignment for remainder of items.
f. Record in log last number assigned.
g. Type item onto screen, using standard format including ID line.
h. Proofread on screen and correct errors in item.
i. Transfer item to disk.
j. Rubber stamp card with "POSTED" stamp, at bottom of card.
k. Repeat steps g-j for each item in group.
1. After all items are on disk, print out item group on line printer.
m. Deliver to section for review and approval.
n. Log action in book.
o. When set is returned by section, after review, log action.
p. Make corrections indicated, pulling items from disk to screen for the operation.

q. Repeat the printout, deliver to section for review and approval, and making corrections steps until all items are letter perfect, and Supervisor approves printout.

r. File "POSTED" cards in designated file, or return to section.

6. Duplicate Items: Duplicate items are defined as two or more cards with identical wording in the stem and responses, even if the responses are not in the same order. Everyone who reviews a set of items must be alert to detect duplicate items. If duplicates are found before serial numbers are assigned, remove and destroy the duplicates. If found after items are coded, forward both cards to the Item Bank.

   If, during the interim item input phase, an item card marked "POSTED" must be retyped to use on a test, the typist will stamp "POSTED" on the new version. Stamps have been provided to each Examination Section.

7. Record of Time: Since the acquisition of the Item Bank equipment was funded by a federal government grant, the Division is required to record and report the time employees devote to working with the Item Bank.

Appendix 1

Examination Section Responsibility for Item Categories

Responsible Section	Category No.	CATEGORY DESCRIPTION
5	02	ENGLISH
6	03	ARTS
7	05	MATHEMATICS
6	06	STAT AND EXPER METHODOLOGY
6	07	PHYSICS
6	08	CHEMISTRY
6	09	BIOLOGY
6	10	MORGUE TECHNOLOGY
4	11	ADMINISTRATION
5	12	PUBLIC RELATIONS
5	13	PERSONNEL ADMINISTRATION
5	14	SOCIAL INSURANCE
5	15	EMPLOYMENT SERVICE OPERATION
5	16	OFFICE PRACTICES
3	17	N.J. LAWS, RULES & REGS
3	18	LAW
6	19	PSYCHOLOGY
6	20	SOCIAL SERVICES
4	21	COMMUNITY AFFAIRS
6	22	REHABILITATION
6	23	SOCIOLOGY
5	24	ECONOMICS
3	25	POLITICAL SCIENCE
4	26	ACCOUNTING
4	27	BOOKKEEPING
4	28	AUDITING
6	29	LABORATORY SCIENCE
4	30	BUDGETING
4	31	INVESTMENTS
4	32	BANKING
4	33	INSURANCE
4	34	PURCHASING
7	35	GEOGRAPHY
5	36	RECREATION AND ATHLETICS
1	37	SEAMANSHIP
7	38	AERONAUTICS
7	39	GEOLOGY
2	40	REAL ESTATE
6	41	MEDICAL
6	42	FIRST AID
6	43	PUBLIC HEALTH
7	44	MAP READING

Responsible Section	Category No.	CATEGORY DESCRIPTION
1	45	TRADES
4	46	CIVIL DEFENSE
7	47	OUTDOOR ADVERTISING
*3&6	48	SAFETY PRACTICES
3	49	FIRE PROTECTION
1	50	WEIGHTS AND MEASURES
2	51	DATA PROCESSING
1	52	AUDIO VISUAL EQUIP & PROCESS
5	53	LIBRARY
5	54	VETERANS SERVICES
7	55	ENVIRONMENTAL PROTECTION
5	56	RURAL INDUSTRY
7	57	ENGINEERING
7	58	STATE & LOCAL BLDG CODES
3	59	LAW ENFORCEMENT AND PROTECT
1	60	SERVICE INDUSTRIES
1	61	MECHANICAL APTITUDE
1	62	PRINTING
**	63	REPORT WRITING & RECORD KEEP

* 3 & 6 claimed part responsibility
** NEW CATEGORY

ITEM BANK LOG

SECTION: DATE REC'D: NUMBER OF ITEMS:

CATEGORY					
NUMBER OF ITEMS					
PRINTOUT TO SECTION					
PRINTOUT TO ITEM BANK					

PRINTOUT APPROVED _____

SECTION: DATE REC'D: NUMBER OF ITEMS:

CATEGORY					
NUMBER OF ITEMS					
PRINTOUT TO SECTION					
PRINTOUT TO ITEM BANK					

PRINTOUT APPROVED _____

SECTION: DATE REC'D: NUMBER OF ITEMS:

CATEGORY					
NUMBER OF ITEMS					
PRINTOUT TO SECTION					
PRINTOUT TO ITEM BANK					

PRINTOUT APPROVED _____

SECTION: DATE REC'D: NUMBER OF ITEMS:

CATEGORY					
NUMBER OF ITEMS					
PRINTOUT TO SECTION					
PRINTOUT TO ITEM BANK					

PRINTOUT APPROVED _____

SECTION: DATE REC'D: NUMBER OF ITEMS:

CATEGORY					
NUMBER OF ITEMS					
PRINTOUT TO SECTION					
PRINTOUT TO ITEM BANK					

PRINTOUT APPROVED _____

Procedure for Illustration of Test Items

Introduction: The one element of some test items that cannot be accommodated on the word processor is diagrams, illustrations, maps, and pictorial charts. The purpose of this procedure is to prescribe the handling and use of illustrative material for tests.

Procedures:

1. Small illustrations, of approximately 2" by 2", that formerly were on item cards are filed in individual envelopes that carry the full item identification number. The numbers are also on a cut-off tab below the illustration. Several duplicate photocopies of each picture are included in the envelope. Items have been entered in the Item Bank in a format that will print out to leave a space for the picture to be inserted.
2. To facilitate examiners' browsing and selection of items, illustrations falling within a sub-category or unit have been copied onto 8½" x 11" sheets that will accompany the high-speed printout of that sub-category or unit.
3. When a test that will include items with small illustrations is assembled, the master pages will be printed out, leaving spaces for the pictures to be added. The test assembler will obtain the pictures from envelopes in the file. Use a photocopy, not the original picture.
4. Copies should be rubber cemented in their proper spaces on the master pages. Use cement on both surfaces. Copies need not be returned to the files.
5. Full page illustrations are filed in individual folders. After use, refile full page illustrations.

MEMORANDUM ... NEW JERSEY DEPARTMENT OF CIVIL SERVICE

TO: Examination Section Supervisors

DATE: June 17, 1981

FROM: Joseph Boyd JB

SUBJECT: Item Bank scheduling and other matters

In general, the word processor operators have been able to follow the monthly schedule for putting items into the Item Bank. However, when both operators are out, or one operator is out two or more days, the schedule will have to slip. When this happens we will notify one or more sections to skip the next scheduled submission of items. We will try to spread the slippages evenly among the sections.

As you have seen, I try to scan all draft printouts before they go to the sections. However, when I am out for more than a day or two, the printouts pile up on my desk. If you want your material without waiting for me, ask an operator for it. When I know I will be out for a substantial time (like July 20-August 7, when I'll be on vacation) the printouts will be delivered to you without a preliminary review.

Please remember that operators need to see, and log in, the final error-free printouts that we deliver to you. You can have them back if you want them.

I have accumulated the following notes about reviewed items and the way the printouts look:

** Any symbol or character that does not appear on the low speed printer, will be shown as [ ] on draft printouts, and as blank spaces on camera ready printouts. Sections are responsible for inserting the missing characters in camera ready copy.

** The notation "?Duplicate?" on a draft printout indicates that a reviewer believes the item appears in an earlier position on the printout. The Examination Section is responsible for determining if, in fact, the item is a duplicate.

** On the high speed draft printer, subscripts, superscripts, degree signs, etc., show up on the print line rather than high or low. However, they do print properly on camera ready copy.

** If items from more than one 6-digit unit are included in a pack submitted to the Item Bank, they must be sorted by 6-digit code. Scrambled sets of items are very hard to process, and nearly impossible to refer to for review.

It will be a great help if you will give us a count of the number of items in each category you submit.

CS-41 L ● REVISED 11/8/76

IF CHECKED ☐ REPLY MAY BE MADE IN LONGHAND HEREON

** Items for which the operator cannot be sure of the correct key (handwritten and typed key letters in conflict) will be returned with a note, "Please verify key."

** The question has been asked, "What do I do about items I have in a category that is the responsibility of another section?" The answer is, "Be sure they are coded correctly, then submit them to the Item Bank. No approval by the other section is necessary."

NOTE: A decision was made later to place the number of the section submitting an item as the last element of the identification/reference area of the item.

Procedures For Changing the Item File Catalog

1. Requests for changes or additions to the Item File Catalog will be made by memorandum to the Item Bank coordinator. If the change is requested by a section that does not have primary responsibility for the item category, the memorandum must be endorsed by the supervisor of the section that does have the responsibilty.
2. Before the requested change becomes effective, the Item Bank coordinator will determine that (a) the requested category numbers have not already been assigned, and (b) that there are no items already in the Bank in the unit for which a title change or deletion is requested.
3. If the requested change or addition cannot reasonably be accepted, the Item Bank coordinator will suggest a solution.
4. The Item Bank coordinator will distribute copies of all changes and additions to all Examination Sections as soon as they are accepted.
5. Sections will not submit items to the Item Bank that incorporate proposed changes to the Item File Catalog until the modifications have been accepted.

MEMORANDUM ... NEW JERSEY DEPARTMENT OF CIVIL SERVICE

TO: Examination Section Supervisors DATE: November 6, 1981

FROM: J. L. Boyd

SUBJECT: Test or Subtest Assembly From Item Bank

This is a temporary communication to you, pending issuance of an Item Bank Procedure on Test Assembly.

Although the current priority of the Item Bank is putting items into the Bank, we will be able to do some work in test and subtest assembly and preparation of camera-ready copy. On request from an Examiner, approved by the Supervisor, Item Room Operators will assemble a requested set of items and directions on a "working disk". A high speed printout of this disk will be provided if needed. Your section typist will be able to manipulate the material on the working disk to produce camera-ready copy from the CPT Word Processing System. Section typists have been give an introduction to operation of the word processors; however, few can operate the console or printer without the help of an Item Bank Operator. We will provide as much of that help as we can. But, we are not yet ready, or able, to go into full scale test assembly and production.

Several recent requests have not been easy for us to comply with; they asked for material to be ready the next day. To give us time to act on your requests without disrupting our schedule, please follow this rule:

> Request for test assembly or camera-ready test copy must be made to the item Bank at least five working days before the finished copy must be in the hands of the requestor.

Subject to this restriction, we will try to give you whatever you want from the Item Bank.

Procedures for Obtaining Camera-Ready Test Copy

1. Examiner prepares a form to code numbers of directions and items, in desired order, of elements that will make up the test. Booklet number is also recorded on the form. Delivers to Item Bank.
2. Item Bank Operator (IBO) produces a working disk of the test as specified, including code lines.
3. IBO prints draft copy of test. Delivers to Examiner.
4. Examiner proofs and edits draft as necessary. Returns proof to IBO, and informs section typists that working disk is ready.
5. Typist makes specified changes on disk.
6. Exam typist reformats disk, adjusts page length, and adds item numbers. Exam typist prints camera-ready copy and returns disk to IBO. These operations will be done on the Item Room word processing system.
7. If pictures are required, the exam typist retrieves them from the file in the Item Room and attaches them to the printout. Characters that cannot be printed by the word processor are shown as brackets [ ] on the draft copy, and as blank spaces on the camera-ready copy. The exam typist inserts those characters by hand or typewriter and delivers completed test copy to the Examiner.
8. The working disk will not be removed from the Item Room; but will be retained in the Item Bank files until the tests have been printed. Then the working disk will be erased for reuse.

An objective of these procedures is to retain maximum responsibility for quality and schedule of test copy in the hands of the examination sections.

Request for

☐ Draft Printout

☐ Camera Ready Copy

For Section _____

Examiner _____
( )

Operator ( )

Booklet # _____

Title _____

_____

Symbol _____

Date

to Printer _____

of Request _____

Returned ( )

to Section( )

Note: Item Bank will fill in spaces enclosed by ( ).

Item Number	Code Number/Letters Change in Item	Item Number	Code Number/Letters Change in Item

Request for Item Bank Service (Try-out form) February 1982

Booklet # Page of

Item Number	Code Number/Letters Change in Item	Item Number	Code Number/Letters Change in Item

Request for Item Bank Service - Continued

APPENDIX III

PLACEMENT OF EQUIPMENT

The attached charts indicate the ways the word processing printers and consoles will be located in the Examination Sections, as equipment on order and to be ordered later is delivered. Priority for placing consoles and printers is based on a number of factors. Among them are frequency of use of the Item Bank, physical proximity of the sections, space available, and skill of section typists in operating the word processor. Progress from phase to phase is designed so that each equipment augmentation is an add-on, requiring the minimum of moving of equipment, and requiring no recabling to connect components.

Phase I will be implemented on delivery of one console and one printer. On the diagram, cable connections are shown by solid lines, shared use is shown by dotted lines. Sections are shown in the order of location of their offices. (Section 1 office is next door to Section 7, for example). In this phase, two sections share each console, except Section 4; and three or four sections share a printer.

Phase II will follow the delivery of one additional printer. This phase will also see all consoles upgraded to 8100 models.

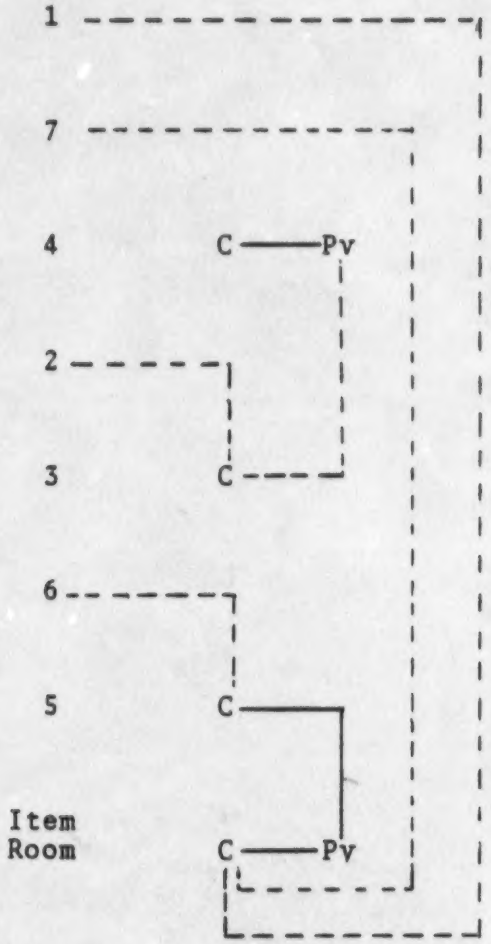
Phase III is the final arragement of equipment, after delivery of four more consoles and a dual type-face printer. Each section will have a console, and will share a printer.

There will be interim phases between II and III, depending upon the funds available in subsequent years to purchase the necessary equipment. Details of these plans may change if Sections relocate, and if the pattern of machine use changes significantly.

The final diagram, entitled "Item Bank and Test Production System" shows how all major components will be interconnected. The 8102 console is an advanced model that will drive the dual type-face printer.

Phase I (on delivery of 1 Console, 1 Rotary V printer)

Section



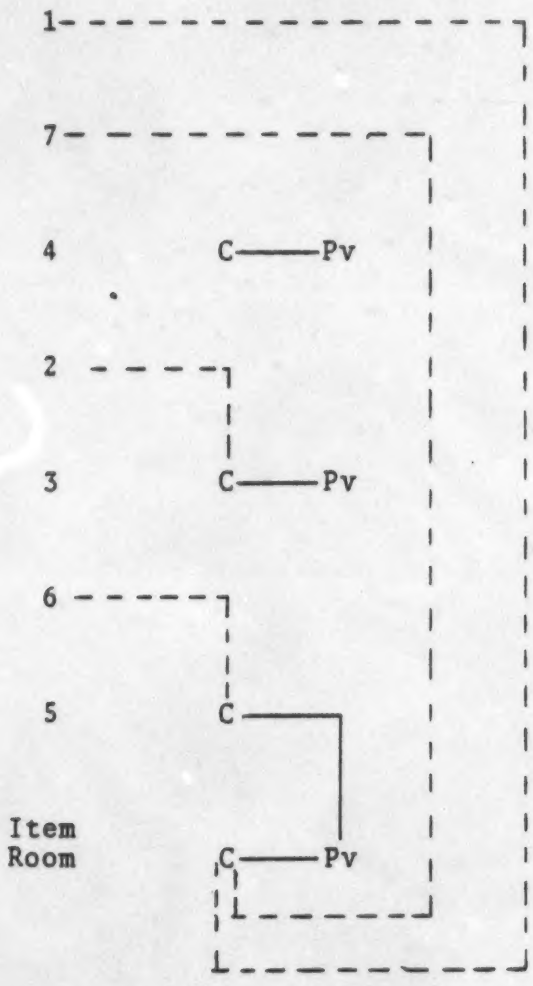
C = Console

P_V = Rotary V Printer

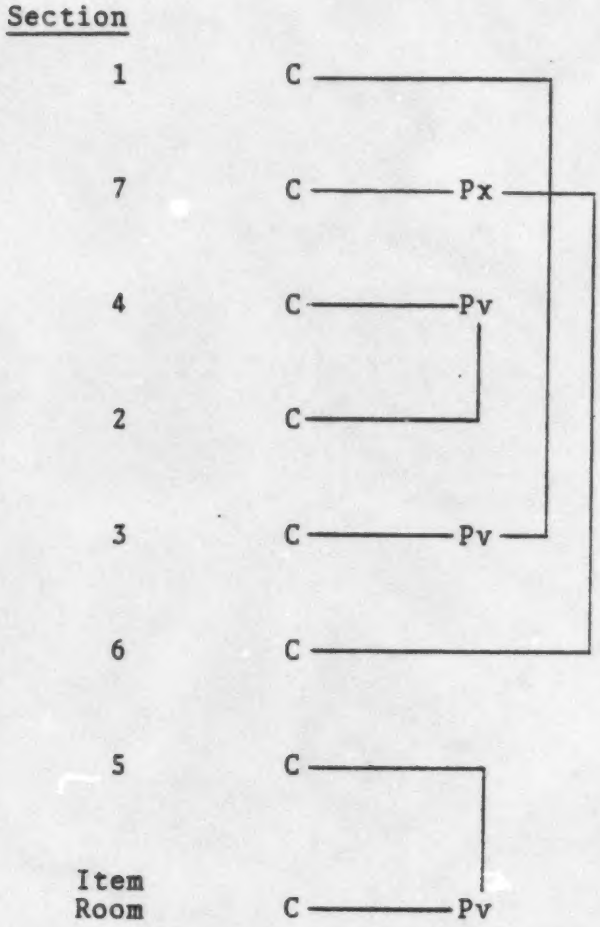
Phase II (on delivery of 1 Rotary V printer)

(adds Pv to Sect 3)

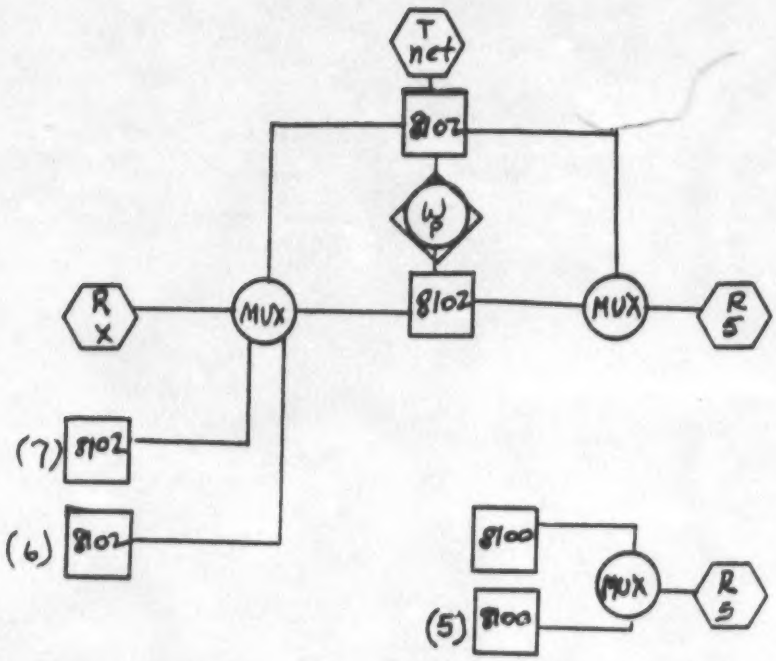
Section



Phase III (on delivery of 4 consoles and 1 Rotary X printer, FY'84)



ITEM BANK and TEST PRODUCTION SYSTEM
Optimum Configuration and Equipment



Legend:

T-Net	Terminet 510; 300 lpm printer
8102	CPT Word Processor Console
WP	CPT Wordpack; 50 million character hard-disk storage unit
RX	Printer; scientific/math capability
MUX	Multiplexer; connects up to 4 consoles to a printer
R5	CPT Rotary V Printer
8100	CPT 8100 word processor console
(7)	Examination Section to which a console is assigned. Sections 6 and 7 produce scientific and engineering tests

APPENDIX IV

Problems and Solutions in Installing a Word Processing System for Item Banking

Assembly of a number of components produced by several manufacturers into an operating system can yield, among other things, frustration. The selection of one of several printers offered by the vendor may have the effect of limiting choice of other printers. Selection of a component that has been announced, but that has not yet been produced and sold, can cause other problems. Specific examples relating to this project are discussed below.

CPT offers both the Diablo and Qume daisy wheel printer. We chose the Diablo, which was described as more trouble-free and sturdier than the Qume. Two years later, when it became apparent that a dual head printer, capable of printing both a conventional alphabet and a Greek/mathematics symbol alphabet, should be incorporated into the system, we learned that only Qume produced such a machine. Qume and Diablo printers cannot be intermixed in a system. We await the availability of a suitable Diablo printer.

We specified a 300 line per minute printer for the system. The CPT representative offered the General Electric Terminet 510 printer. As a printer, the machine is fantastic. It prints five pages a minute! The type is solid, not a dot matrix like most high-speed printers. Used with a carbon film ribbon the quality of the printout is the equal of the highest quality electric typewriter. When used with the less expensive nylon fabric ribbon the printout is very legible, equal to a good manual typewriter. The Terminet would be a good choice for a one console--one printer system. CPT provided a program disk for the Terminet. Unfortunately, the Terminet is not compatible with the Diablo, so programs have to be changed as each printer is selected. CPT representatives tell us that second generation programming for the Terminet will be available in the future.

Another problem was that CPT could not provide service for the Terminet, although they service both Diablo and Qume printers. Fortunately, the Terminet has required very little service; but on one occasion CPT said a fault was in the printer, the GE repairman said the fault was in the system. The solution was to deactivate the end-of-page bell, which had been ringing at the end of each line. One-company responsibility for service is better.

A 50-million character random access storage unit was an essential element of the system we specified. CPT included the WordPak II, with extension, in its proposal. Although CPT had announced availability of the unit, none had been delivered. As it turned out, the WordPak II and its programming did not work well with the model 8000 console. Delivery was delayed 18 months, and the 8000 consoles had to be upgraded to Model 8100's. The upgrading primarily involved increasing the internal memory of the consoles from 64 kilo bytes to 128 kilo bytes. The upgrading is useful with programs other than word processing, such as sort, math, and spelling.

A few more suggestions for those who may move toward item banking with word processors.

1. Order a good supply of printer ribbons.
2. Get typeface books, select a typeface (we chose Titan 10), decide whether you want to use 10 or 12 pitch.
3. If the print wheels will be plastic, order several spares. If print wheels will be metal, one spare will be enough. In 18 months of operation we have not had to replace a metal print wheel.
4. Include the SORT and SPELL programs in your initial order. SORT will help you find duplicate items; SPELL will simplify proofreading.
5. If you don't already have one get a HALON 1211 fire extinguisher. They are safe with electronic chips--will not freeze or damage circuitry. Ordinary CO_2 extinguishers are DEATH to chip circuits.

6. If the room in which the system will be located is carpeted, or if static electricity is generated when the room is heated, get a grounded static-mat for each console.
7. Ordinary typewriter style furniture is not satisfactory for word processors. Consoles weigh about 120 pounds and need stands or desks made for the purpose.
8. Printers should have separate stands so that their vibrations will not affect consoles.
9. The ordinarily available 15 pound substance, continuous feed, fan-folded, 9½" x 11" paper is satisfactory for draft printouts. For camera-ready printouts, get 20 pound paper, or your print shop will complain.
10. To request additional information, ask questions, or arrange to visit to see the system in operation, call: Dr. J.L. Boyd, area code (609) 984-1771, or write to the address on the cover of this report.